

BUICK

VALVE-IN-HEAD
MOTOR CARS



SIX CYLINDER
OPEN AND
CLOSED
MODELS

BUICK MOTOR COMPANY

Pioneer Builders of Valve-in-Head Motor Cars

MAIN OFFICE AND FACTORY, FLINT, MICHIGAN

BRANCHES IN ALL PRINCIPAL CITIES—DEALERS EVERYWHERE



What labor-saving machinery has done for industry in general,
the motor car has done for the individual.



Buick Utility

UTILITY, as expressed in the various Buick Valve-in-Head models for nineteen-twenty, is a composite thing, made up of those elements which may be considered vital factors in the serviceability of a motor car.

This utility has been arrived at through the experience of nearly twenty years, during which time the Buick course has been characterized by unwavering fidelity to accepted engineering ideals, and constructive advancement has been made by the processes of improvement and elimination.

The absence of radical departures in manufacture and design has made possible the up-building of the Buick car as a thoroughly consistent whole, the designing effort being evenly distributed over the entire car every season, in order that no detail of its complete utility should be slighted.

Convenience has been developed side by side with efficiency. Comfort has increased in the same ratio as strength and long wearing qualities. New and better body types have been devised while lighter and stronger materials were being brought into service.

Always, Buick cars have been developed, not re-designed. And for nineteen-twenty they reach the highest pinnacle in this development. Each model has a certain scope, a particular range of usefulness. Enough models have been provided in the complete Buick line to enable any purchaser to select a Buick car that is exactly equipped to serve him to the utmost limit of his demands for utility.

Buick Three-Passenger Roadster

THE BUICK Model K-Six-44 possesses marked advantages for the man or woman who wishes a car of limited passenger capacity, with an exceptionally roomy and comfortable driving compartment. This three-passenger model makes the most of these desirable features, without sacrificing one whit of the modish appearance that belongs to the type.

The body is distinctly a Buick creation, broadening out to accommodate a wide, deep seat for three, then curving in at the back to form a trim rear deck with a weather-proof carrying space for luggage.

The dimensions of the driving compartment insure easy entrance or exit from either side, with the control and brake levers well forward but within easy reach. The French pleated upholstery is built for long wear and comfort. The illuminated Buick instrument board contains the lighting and ignition switches, ammeter, speedometer, oil pressure gauge and dash choker for cold weather starting, all conveniently placed in plain view.

Inclined windshield, handsome improved top of high grade material, side curtains that swing open with the doors, large gasoline tank and extra demountable rim complete the equipment of this smart, business-like car.

*Many hand-rubbed coats
of paint and varnish make
Buick finish lasting*



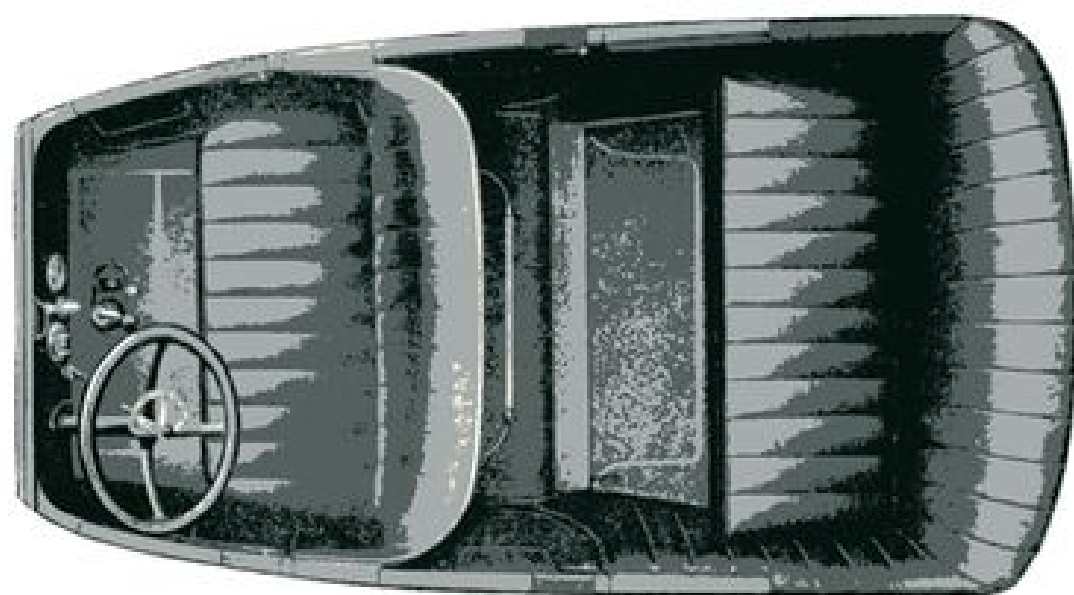
Buick Five-Passenger Touring Car

THE BUICK Model K-Six-45 is a very capable open car for five persons, designed to cover the multitude of uses to which such a car is put. It differs from the big seven-passenger model only in tonneau and chassis length, possessing the same degree of ruggedness, easy-flowing power and mechanical excellence.

There is far more comfort in the driving compartment than is usually found in cars of this type. The floor space is uncluttered and the seat is of great depth.

The tonneau is even more liberally proportioned. The seat is full three-passenger capacity, set at a comfortable angle. The sides are upholstered clear to the doors with the same French pleated leather used on the cushions and seat backs. Each of the four doors is equipped with a side pocket for storing small parcels. The instrument board is illuminated by a dash lamp. Top and side curtains are made of high grade fabric, the curtains swinging open with the doors. Behind the front seat is a very convenient pocket for storing the side curtains when not in use.

*The hair in Buick
upholstery is pressed into
pads and cannot spread*



Buick Touring Coupe

THE BUICK Model K-Six-46 is a true Coupe model, with permanent sides and roof, an exceptionally wide body, and its graceful contour eliminates all open spaces between the body and fenders. From the outside, the appearance of the car is low, rakish and well-balanced, but there has been no sacrifice of interior head room. The rear fenders are new in design, with touring car running boards. Top, window casings and sashes are fully metal covered, eliminating the possibility of checks and open joints.

A Pullman type chair is provided for the driver, with a wide seat for two set slightly back of the driver's seat and an extra seat which swings out of the way under the cowl.

The back window is permanent, while the side windows may be lowered, the door windows being equipped with patented handles. There is a three-piece windshield of the storm-vision type, and a new-design, tilting type steering wheel.

The deeply upholstered interior is finished in a new and improved fabric, without bindings. Back of the driver's seat is a carrying space, with another in the rear deck. Electric side lamps are mounted on the cowl and a dome illuminates the interior. The double-latch doors may be locked from the outside.

*The completeness of
detail in Buick cars adds
materially to comfort*



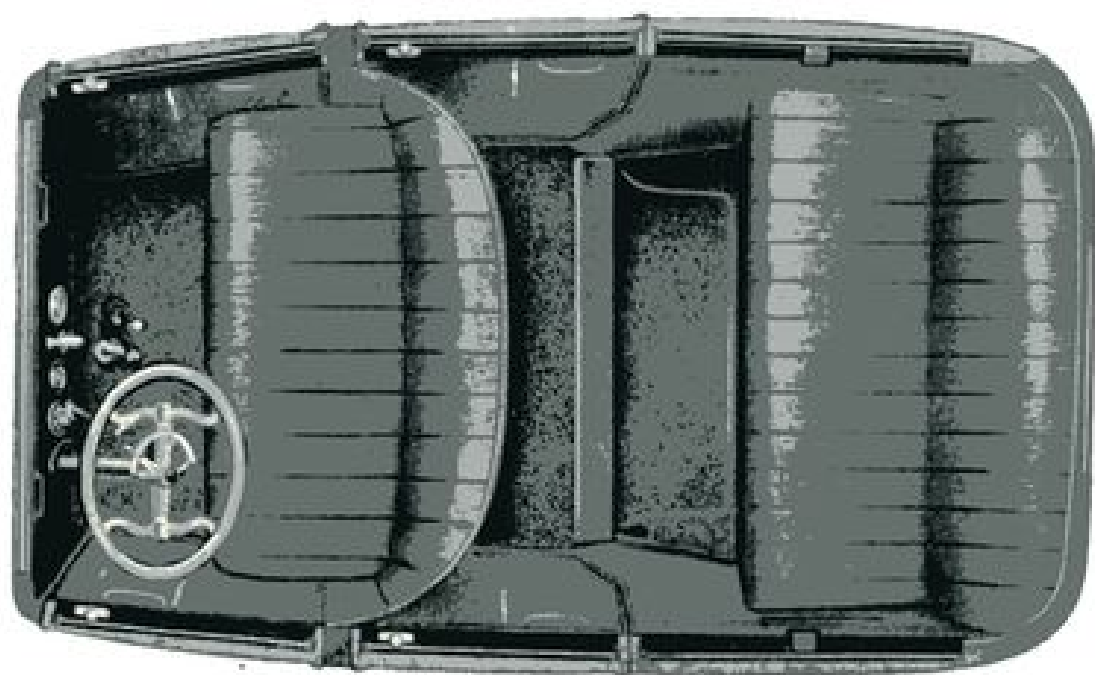
Buick Touring Sedan

THE BUICK Model K-Six-47 follows the design and lines of the Buick seven-passenger Sedan very closely. The body is of new design, low in appearance but with ample head room. Top, window casings and sashes are fully covered with metal, giving perfect uniformity in finish and durability. All doors are properly hinged and fitted with double latches. The front seat extends across the body and there is a new-design, tilting steering wheel. The low seats give great riding comfort.

The interior is finished in handsome fabric, without bindings, with deep upholstery. Cold weather snugness or summer driving comfort are equally available by adjusting the three-piece windshield and windows. The windows are raised or lowered by patented devices operated by simply turning a handle.

The tonneau carpet matches the upholstery. The standard Buick instrument board furnishes every driving convenience and a dome light in the ceiling illuminates the interior. The cowl carries two handsome side lamps.

*Buick riding qualities
are chiefly due to specially
designed spring construction*



Buick Seven-Passenger Touring Car

THE BUICK Model-K-Six-49 is a big, roomy, open car for seven persons, with a range of service in keeping with its powerful Valve-in-Head motor. The long wheelbase, the extra size tonneau, the completeness of all details making for comfort and convenience give it an air of unlimited capacity that is amply borne out by its continued and consistent performance.

This body is divided by a double cowl, into which the folding seats disappear when not in service. These extra seats are so arranged as to give liberal space to all occupants in the tonneau, thereby avoiding any possible crowding.

The slanting windshield braces form the front support for the high-grade top, which is also equipped with well-made side curtains that swing open with the doors.

The upholstery and finish of this model are exceptionally fine and durable. The illuminated instrument board is unusually complete, and a light located by the right rear door illumines both the tonneau and step.

*Buick power not only
meets all ordinary requirements,
but emergencies as well*



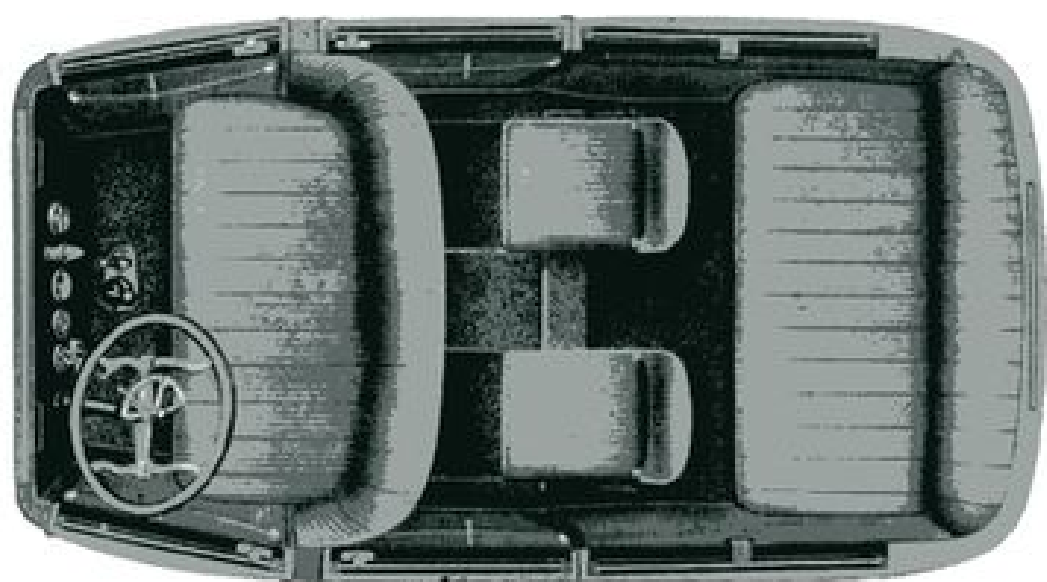
Buick Sedan for Seven

THE BUICK Model K-Six-50 four-door Sedan is the latest development in closed car design. The front seat, instead of being divided, is full width, giving additional roominess to passengers and providing an extra brace to the body which adds considerably to its stability.

The latest type of cowl and side lamps, tilting steering wheel and satin finished interior trimmings are featured in this Sedan. The lining is done in rich plush, without binding. Altered lines and low-hung body give added grace to the exterior without sacrificing head-room. The main compartment accommodates two disappearing seats, which are built for genuine comfort.

Silk shades on rollers afford privacy or shut out a too ardent sun. Ventilation is controlled by the adjustable windows and windshield, the door windows being fitted with patent handles for raising or lowering them. Suitable lights give interior illumination. Both rear doors and the left front door lock inside, and the right front door from the outside, to insure safety when leaving the car. Lowered seats give greater riding comfort.

*Buick economy applies
to repair bills as well as
to gasoline and oil*





Applied chemistry, metallurgy and mechanics combine with scientific design and manufacture to make Buick Valve-in-Head motor cars possible.



Correct Engineering

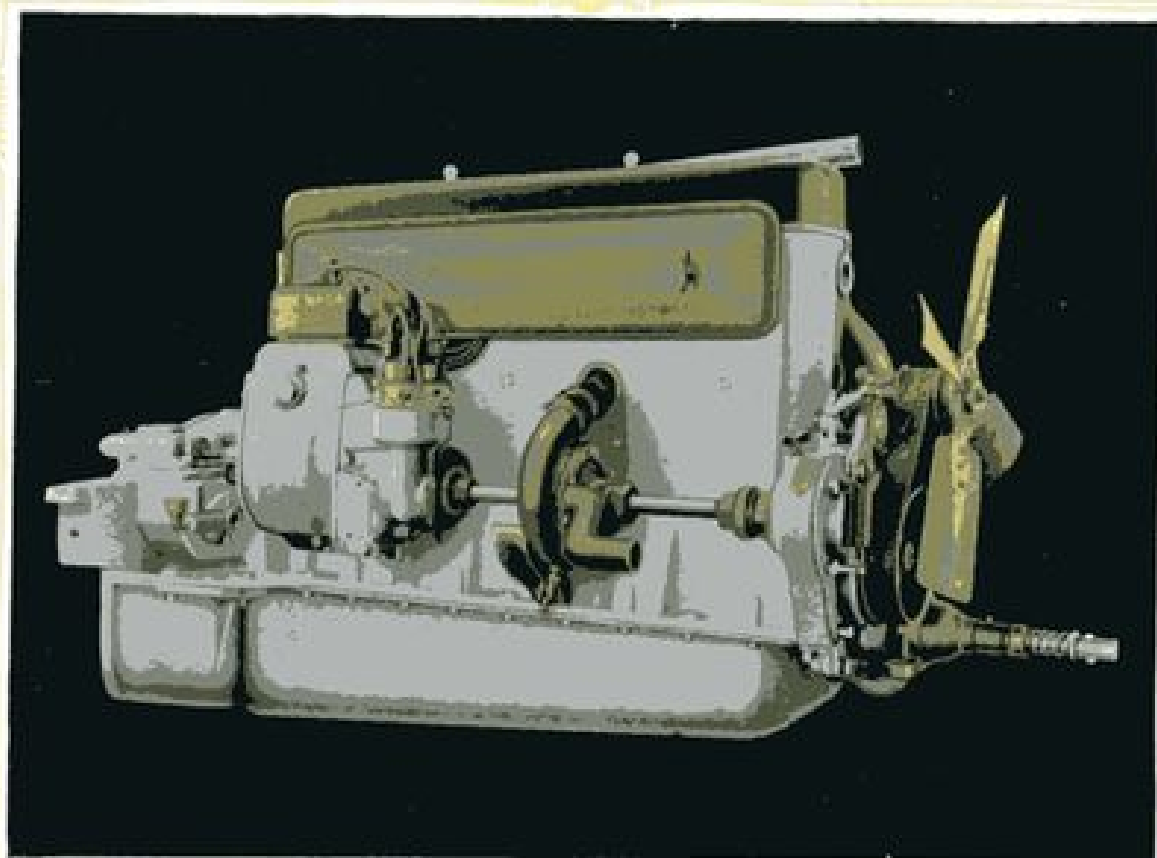
THE chief thing to bear in mind about a motor car is that it is a piece of machinery. Therefore, it must be bought as a machine. Body lines, finish, one-man tops and a hundred other details are quite necessary in reaching the height of the buyer's ideal, but fundamentally they have little to do with long and consistent functioning.

For, in addition to being a wonderful machine, a motor car is a collection of intricate mechanical units, each with a distinct relation to the others and working in harmony with them. The finished car must of necessity be judged by the manner in which these mechanical units are co-ordinated and balanced to make up a well engineered car.

One would hardly be justified in purchasing a car solely on the strength of one or even several of these features. It is only when the correct relation between power and load, comfort and safety, performance and durability, is preserved that we can find true motor car efficiency. And this result can only be obtained after years of scientific study backed by broad experience of the most practical nature.

The Buick chassis has been developed as a perfectly consistent whole. While great emphasis is laid upon the correct design and manufacture of every part, it should also be added that only in conjunction with the rest of the parts as presented in the Buick car do they reach their highest state of efficiency.

The thorough consistency of the Buick car is reflected in its performance, primarily, and is brought home with ever-increasing emphasis the longer the car is run. It is this balance and proportion, resulting from nearly twenty years spent in co-ordinating the parts of the Buick car, that make the Buick so serviceable and economical in everyday service.



The Automatically Lubricated Buick Motor

Buick Valve-in-Head Motor

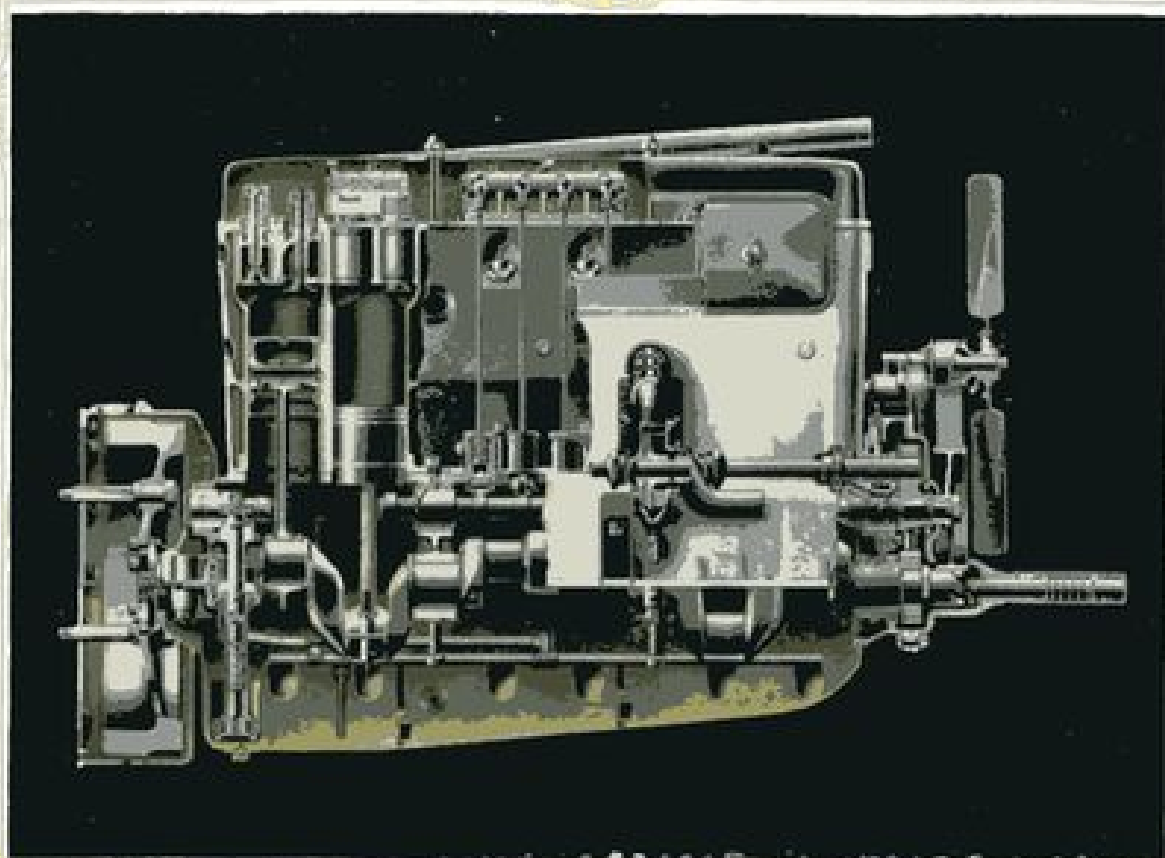
THE Buick Valve-in-Head motor is automatically lubricated throughout. The lubrication of the main bearings, wrist pin bearings, connecting rod bearings and pistons is a combination splash and pump system, with an oil pressure gauge on the dash and a gauge on the crankcase.

The rocker arm shafts on top of the motor are filled with oil. These hollow shafts contain felt fibres, which are constantly saturated with oil, the outer edge of each hollow shaft being fitted with oil wicks.

Through these wicks the oil passes by capillary attraction from the fibre in the hollow shaft to the cups into which the push rods fit, lubricating them. One filling of the bracket reservoir is sufficient for several hundred miles driving.

The oil pump is self-thawing and so constructed that should there be any water in the oil in cold weather, causing the pump to freeze up, the self-thawing apparatus of the Buick oil pump will automatically thaw it out quickly, eliminating the possibility of injury to the pump.

A removable dust proof cover over the top of the motor keeps the entire valve mechanism clean and free from moisture, dust and foreign matter of every description.



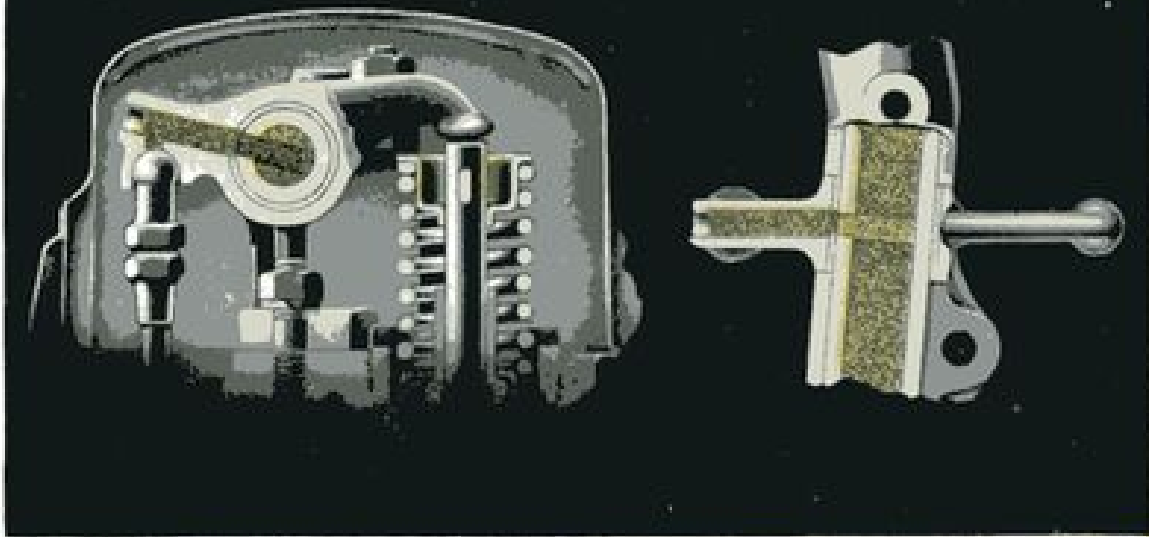
Design of Buick Valve-in-Head Motor

Surplus power and economy is the logical result of the superiority of the Buick Valve-in-Head design, which is very easily explained. There are two principal points to be considered.

The first is that all gasoline engines are heat engines, i. e., they are operated from the heat generated as a result of the explosions, rather than by the explosions themselves. In other words, it is the expansion of the heated gases trying to escape that furnishes the power to push the pistons downward and turn the crankshaft of the motor by means of the connecting rods, which connect the pistons with the crank shaft.

The second point is that the more perfectly the cylinders are cleaned out of the gases generated by the previous explosions, the purer the incoming charges of gas will be and the more perfectly they will burn. And the more perfectly they burn, the greater the amount of heat they will develop from a given amount of gasoline and air.

In the Buick Valve-in-Head motor the valves are located in the tops of the cylinders, right above the pistons, with the spark plugs opening right into the cylinders also. This means a small, simple, compact combustion chamber with the smallest possible water jacketed space. In the L-head and T-head motors the valves are located in pockets at the side, necessitating a complicated explosion chamber with a materially increased water jacketed space to absorb heat and power.

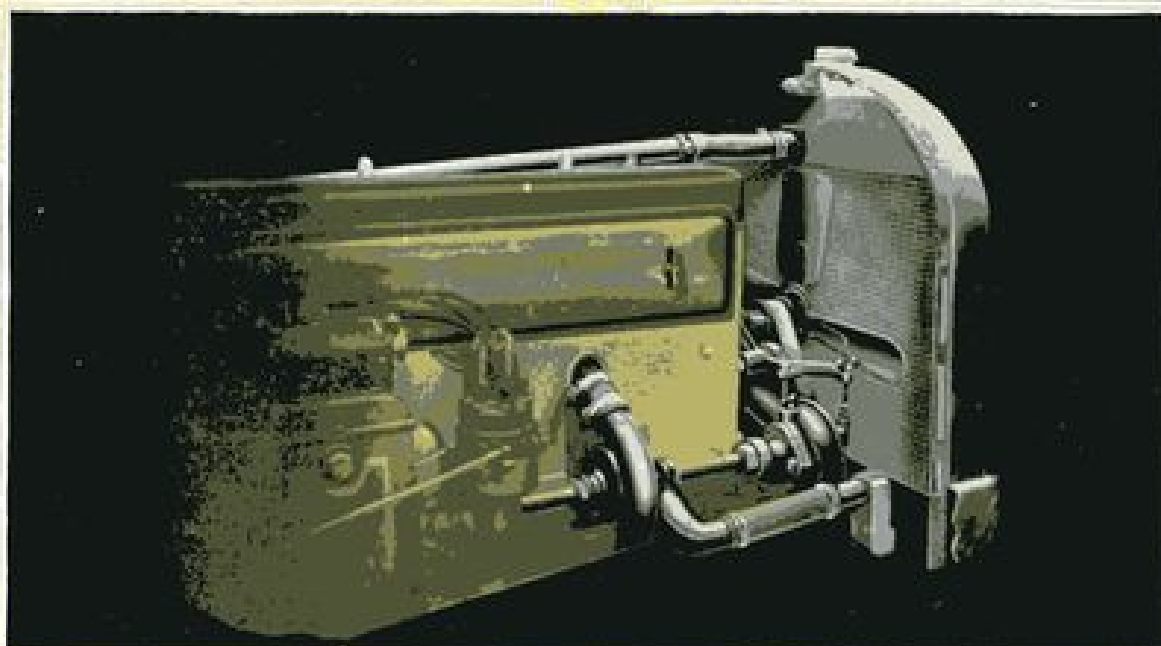


Self-Lubricating Rocker Arm

The heat generated can escape in two ways from a motor. It can be used as power by being directed downward against the piston, or it can escape through the thin cylinder walls by absorption through the water jackets. It is impossible to use all of this heat because the motor must be kept at a certain temperature by the water in order to prevent damage to the cylinders and pistons. But it is quite obvious that the Buick Valve-in-Head motor, because of its greatly reduced water jacketed space, will lose a much smaller amount of the heat through the water jackets and will use the heat saved for power against the pistons which operate the crankshaft.

Then, because the valves are located in a straight line above the pistons, the dead exhaust gases are quickly and easily expelled through the large valves at the conclusion of the working stroke, instead of being forced around corners and downward through a much larger chamber, as in the L-head and T-head types. And the combustion during each working stroke is much more perfect in the Buick motor because the incoming charges are purer and the electric spark has a shorter distance to travel in the brief instant of time that it must do its work in igniting the mixture. In the L-head and T-head types, the spark must not only travel across the cylinders, but across the side pockets as well.

The net result of these characteristics of design is to give the Buick Valve-in-Head motor more perfect combustion than other types of motors, a quicker ignition of the charge and a smaller loss of heat through the water jackets. The sum of these advantages is more power and less gasoline consumption.



Scientific Buick Cooling System

Buick Cooling System

THE Buick cooling system is one of the most essential points in connection with the economical operation of the Buick Valve-in-Head motor, which boasts less water jacketed space than either the L-head or T-head types.

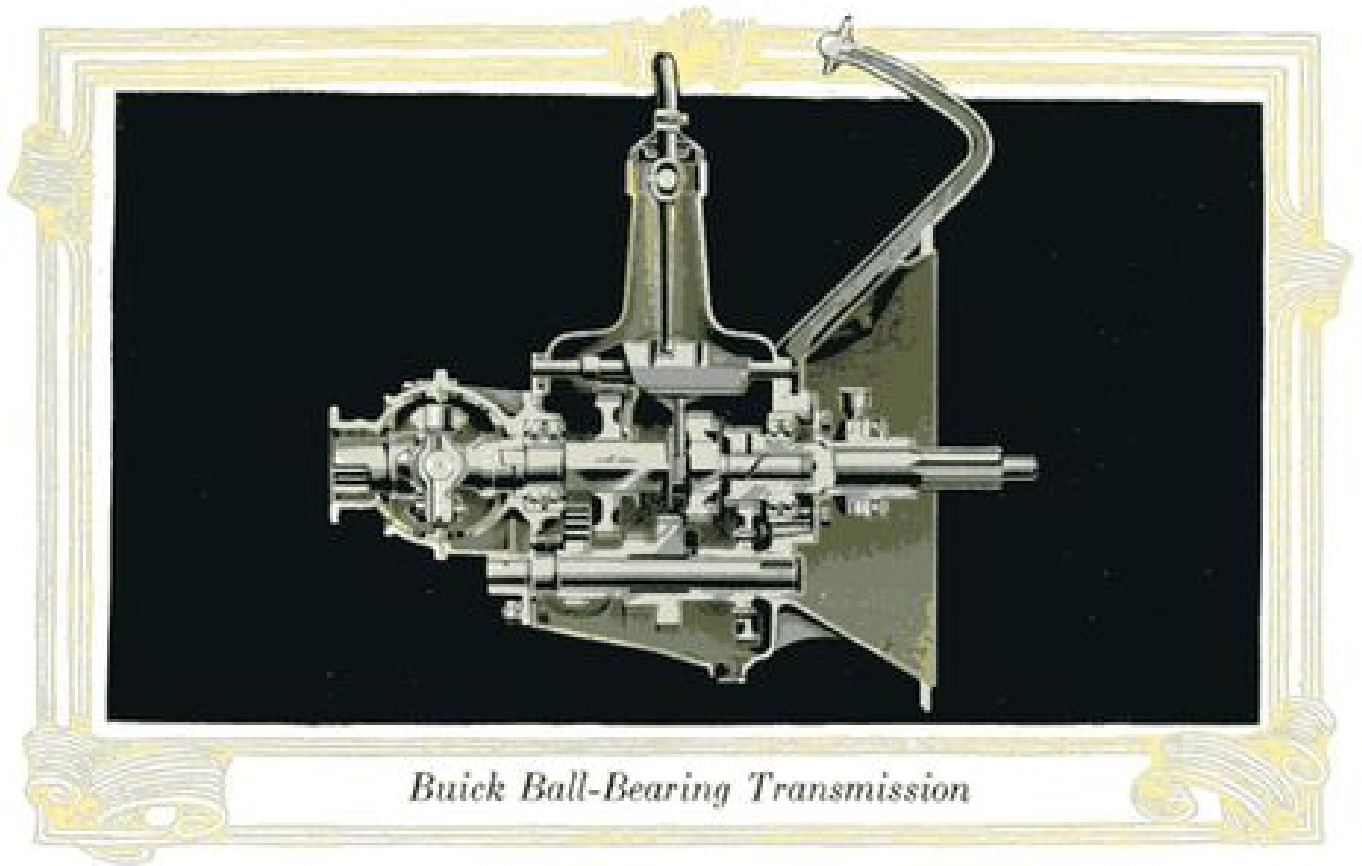
The cooling system on Buick cars consists of the motor water jackets, a cellular radiator of Buick design and manufacture, a fan to draw air through the radiator cells and a centrifugal pump to force the water through the system.

When the cylinder castings are made in the Buick foundry, the greatest care is exercised to see that the cylinder walls are of uniform thickness, to insure even cooling throughout.

The radiators are made from proper material for the radiation of heat. Automatic machines crimp the material into square cells, with a bead molded in every cell along the thinnest surface exposed to the air, which increases the effective cooling surface immensely. The core is formed by soldering these cells together.

The fans are heavily reinforced and are mounted on an adjustable fan bracket, so that the fan belt can be adjusted instantly by turning a thumbscrew.

The efficiency of the cooling system is carefully worked out in the engineering department, to exactly fit it to the motor's needs. Not only are fans, pumps and radiators tested and checked by means of scientific instruments, but they receive many other tests in actual service under varying conditions.



Buick Ball-Bearing Transmission

Buick Transmission

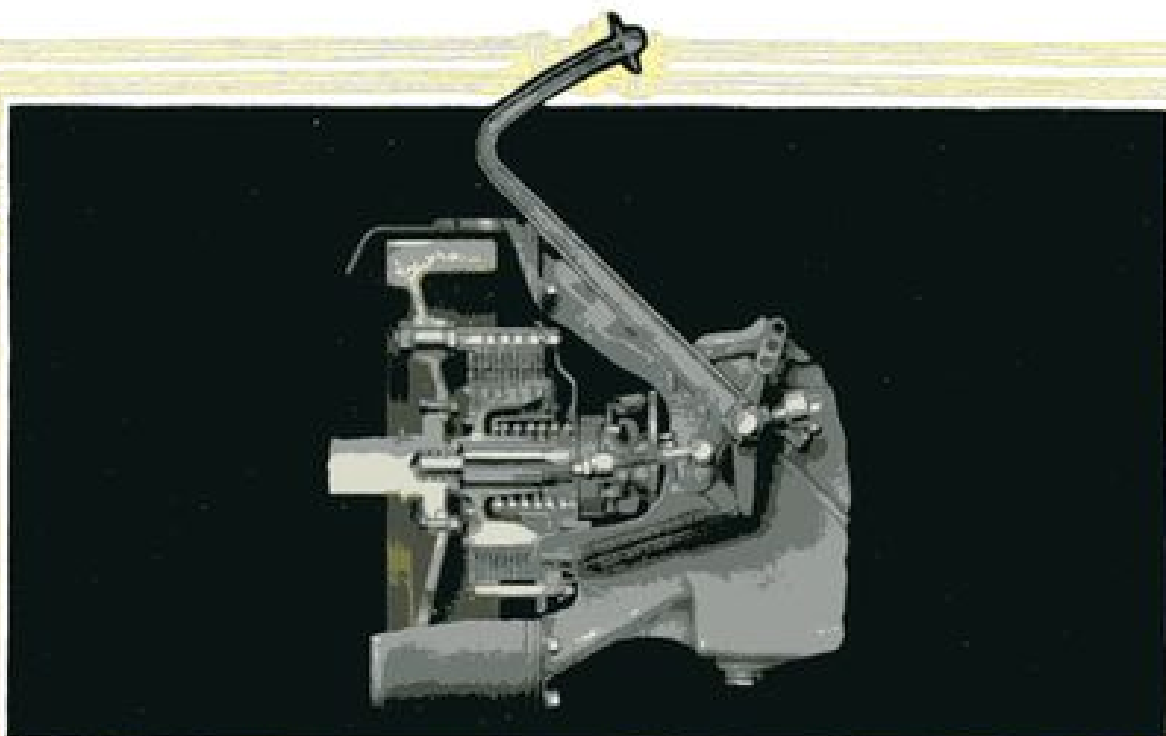
THE sliding gear type of transmission is used on Buick cars because of its strength, convenience and quietness of operation. Three forward speeds are provided, so that the motor speed with relation to the speed of the rear wheels may be instantly adjusted to meet any conditions that may be encountered, such as putting the car in motion, driving in deep sand, heavy mud, on steep grades or ordinary roads. A slight movement of the lever shifts the gears.

The speedometer drive is enclosed in the transmission, thus eliminating all toggle joints and gears from the front axle.

This transmission has one reverse speed, with a greater reduction than any of the forward speeds, which gives the car tremendous power in reverse if the occasion should ever arise to use it. All gears run in a bath of oil, the universal joint at the rear of the case being automatically lubricated from the same source, the oil from the transmission case entering the universal joint through the rear bearing.

Next to design, the two principal factors governing the quality and durability of a transmission are the accuracy of the machining operations and the heat treatment of the gears.

Buick gears are cut from drop forged blanks on wonderful automatic machines, the countershafts and main shafts are ground to exact sizes to fit the gears and bearings, and the gears heat treated so that the wearing surfaces of the teeth are hard to resist wear while the inner portions are made tough to withstand sudden strains and hard pulls without breaking.



Buick Patented Dry Plate Disc Clutch

Dry Plate Disc Clutch

THE exclusive patented features of the Buick disc clutch minimize the effort and skill necessary in gear shifting, and at the same time provide a clutch that is absolutely smooth and positive in operation. Under this patented construction, the heavy rotating parts of the clutch are carried by the flywheel and only the very light parts are carried by the transmission, which accounts for the transmission gears not spinning after the clutch is disengaged, thus preventing the clashing of gears in shifting from one speed to another.

This clutch would have been efficient if the friction area had been reduced by half; but with its ten friction surfaces it is extremely gentle and positive in engagement and will wear for an indefinite length of time.

The clutch is formed by alternate discs, connected with the flywheel and the transmission respectively, the faces of the discs being covered with the finest quality of asbestos material.

The adjustment of this clutch is simplicity itself, being controlled by an adjusting nut on the clutch release rod.

Being a dry plate clutch, it is not necessary to put any oil in the clutch case at any time.

The only lubrication required by the Buick clutch is provided by two grease cups, which are located in a convenient place so they may be turned down occasionally as required.

The slightest pressure of the foot will disengage this smooth acting Buick clutch, which makes it especially popular with women drivers and those who drive much in congested traffic.



Buick Hydraulic Pressed Steel Frame

Buick Frame

THE frame is regarded by Buick engineers as an exceedingly important unit. As its name implies, it is the framework around which the entire car is constructed and a great deal of study has been expended upon it to secure rigidity and strength without excessive weight.

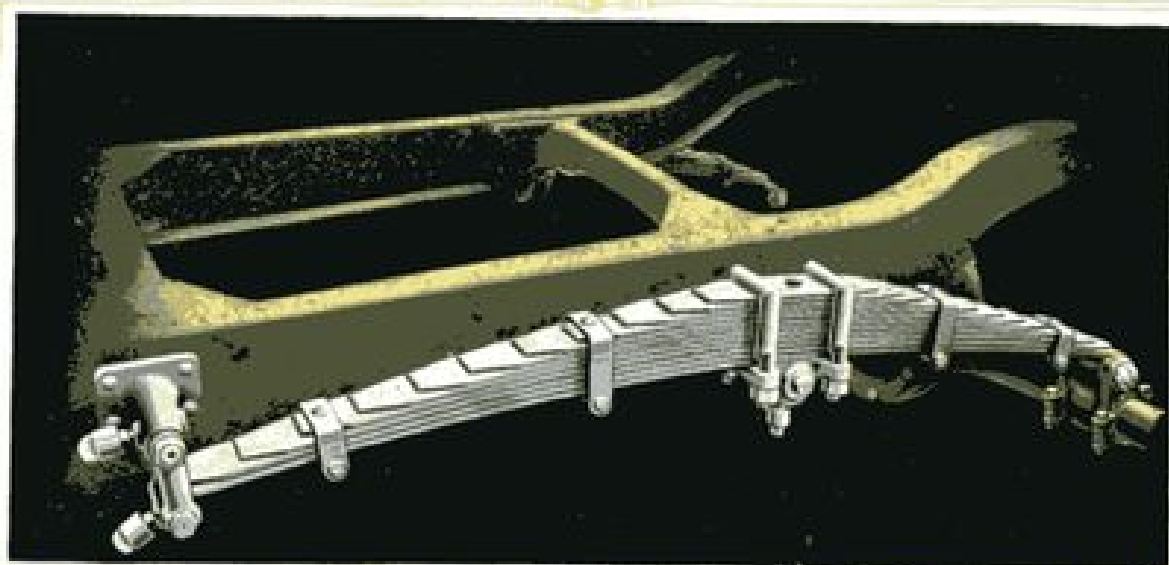
The two main side members are of heavy hydraulic pressed steel, channel section, the channels gradually widening from the front to a point slightly forward of the center, where the strain is greatest, and then tapering off gently to the rear, where there is an offset to accommodate the rear axle and give the maximum road clearance and a low-hung body.

The flanges at the top and bottom of these channels make it almost impossible to bend the frame sideways, and the extreme depth of the channels at the vital points guarantee against sagging even under extraordinary abuse.

Each side member is made of a single piece of metal, and the two are held rigidly together by four stout cross members, also of channel section pressed steel. The cross members are riveted to the side members with steel rivets, which are heated and driven firmly home with pneumatic hammers. In addition to being fastened to the tops and bottoms of the side members, they are still further reinforced by triangular steel plates, which are flanged to rest tightly against the frame.

Additional strength is given to the forward end by the motor support, which is bolted to the frame at the rear of the motor.

The entire Buick mechanism is therefore supported and held in alignment in this cradle of steel, which effectually guards against danger of weaving or distortion at any point.



Buick Specially Designed Cantilever Spring

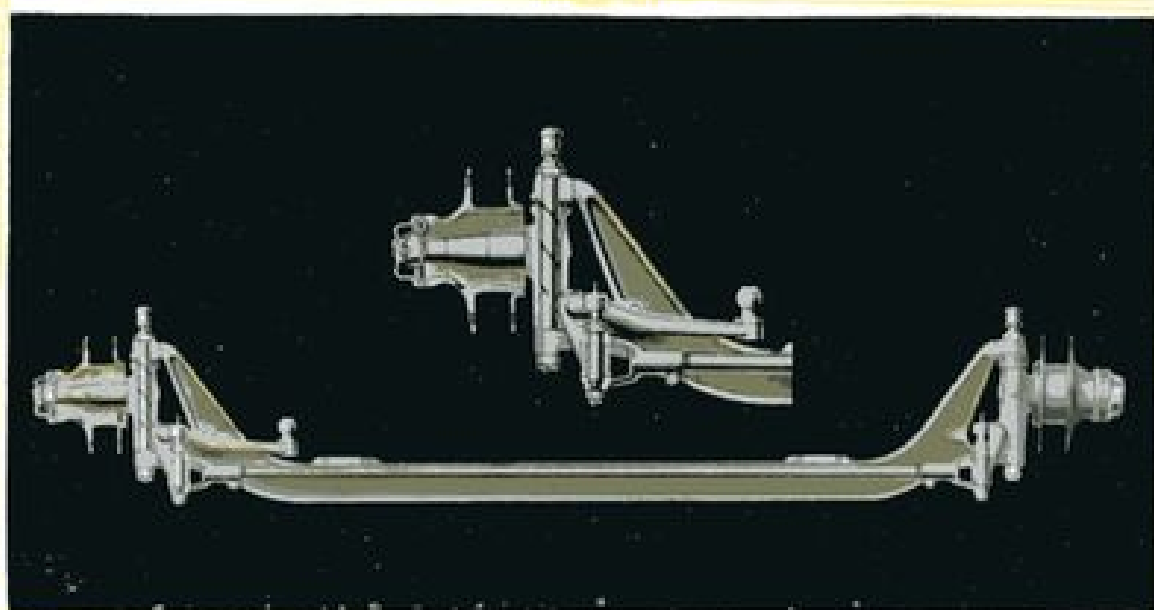
Spring Suspension

THE function of the spring suspension is two-fold. Properly designed springs give comfort to the occupants of the car, which is their first duty, but they also add greatly to the life of the car by protecting the various mechanical parts against shocks and jars, which is no less important.

Two types of springs have been developed for Buick cars—the semi-elliptic for the front end and the cantilever type, purely Buick in design, for the rear.

Briefly, the semi-elliptic type is used on the front of the car because it has been found to be ideally suited to absorb the shocks peculiar to front-end work. The number, length, width and thickness of the spring leaves has been determined upon after exhaustive laboratory and road tests. This is a delicate job, because if the front springs are too flexible they will strike the bumpers on rough roads and the car will be difficult to steer. If too stiff and improperly suspended they will transmit the constantly recurring road shocks to the frame and thence to the motor itself.

The cantilever rear springs have been developed in the same scientific manner and derive their really wonderful ease of action chiefly from their design. The biggest feature of Buick rear springs is the fact that they gauge their resistance according to the load or the shock, lightly oscillating over cobblestones or similar surfaces and offering a gradually increasing resistance the farther the spring is deflected from normal. A glance at the illustration will show how this power multiplies, which is directly opposite to the action of other types, whose resistance decreases as the load increases.



Buick One-Piece Drop Forged Front Axle

Front Axle

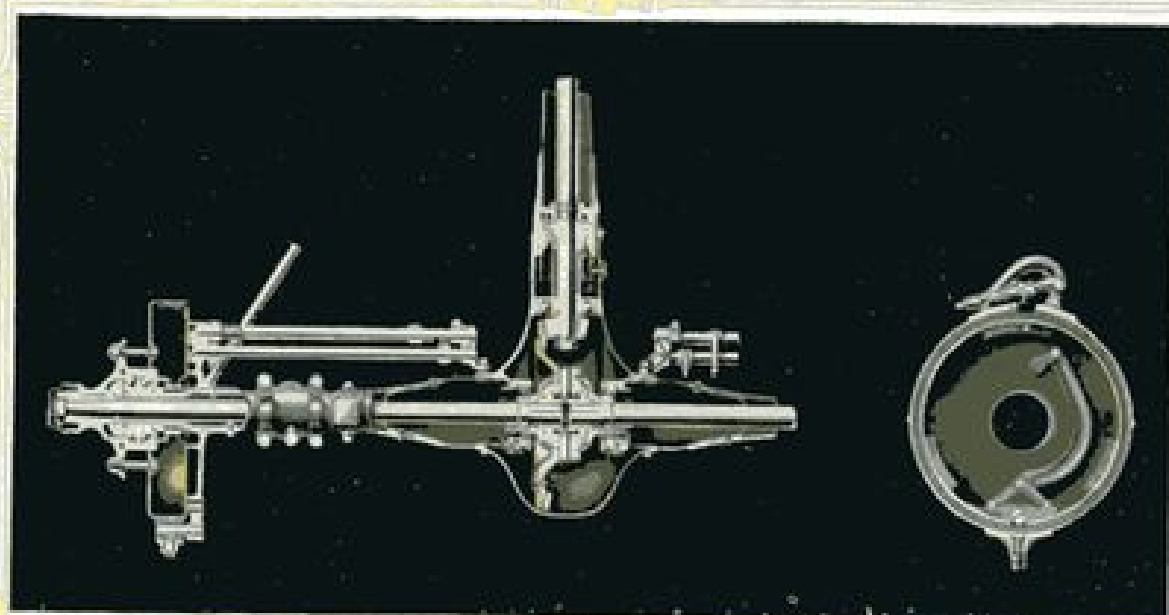
THE BUICK front axle is a single piece of fine steel, forged in the Buick drop forge plant. In form it is what is termed "I-beam," like the great girders that are used in constructing modern bridges and buildings. A cross section of this axle resembles the shape of the capital I, but much thicker in the body, the flanges on the top and bottom adding greatly to its strength without increasing the weight to any extent.

This is the strongest type of front axle that has yet been devised, and owing to the way it is shaped it represents the lowest point in the road clearance of the Buick car. In this way, any obstruction would strike the front axle first.

It is practically impossible to break a Buick front axle, even on the testing machines in the Buick engineering laboratory. Samples are taken from each lot of axles manufactured and placed on great machines that twist them into grotesque shapes and subject them to a downward pressure many times greater than could possibly be placed on them in service.

All raw material is carefully analyzed in the chemical laboratory before it is permitted to be put in the stock bins at the factory. The structure of the steel is made still finer and better by the heating and the ponderous blows of the drop forge hammers, which force the particles of steel closer together and make the structure uniform throughout. The steering spindles are drop forged and tested in a similar manner.

The substantial hub, properly equipped with suitable bearings, is firmly attached to the integral yokes by a stout kingbolt, fitted with a large grease cup conveniently located.



Buick Full Floating Rear Axle

Rear Axle

BUICK rear axles are of the full floating type, which means that the full weight of the car is supported on the sturdy axle housing, rather than on the "live" axle shafts which turn the rear wheels. This relieves the propelling mechanism from all save driving strains, which is important from the stand-points of safety to the car occupants and of undue wear on the mechanism. The torque is taken up by two stout reach rods.

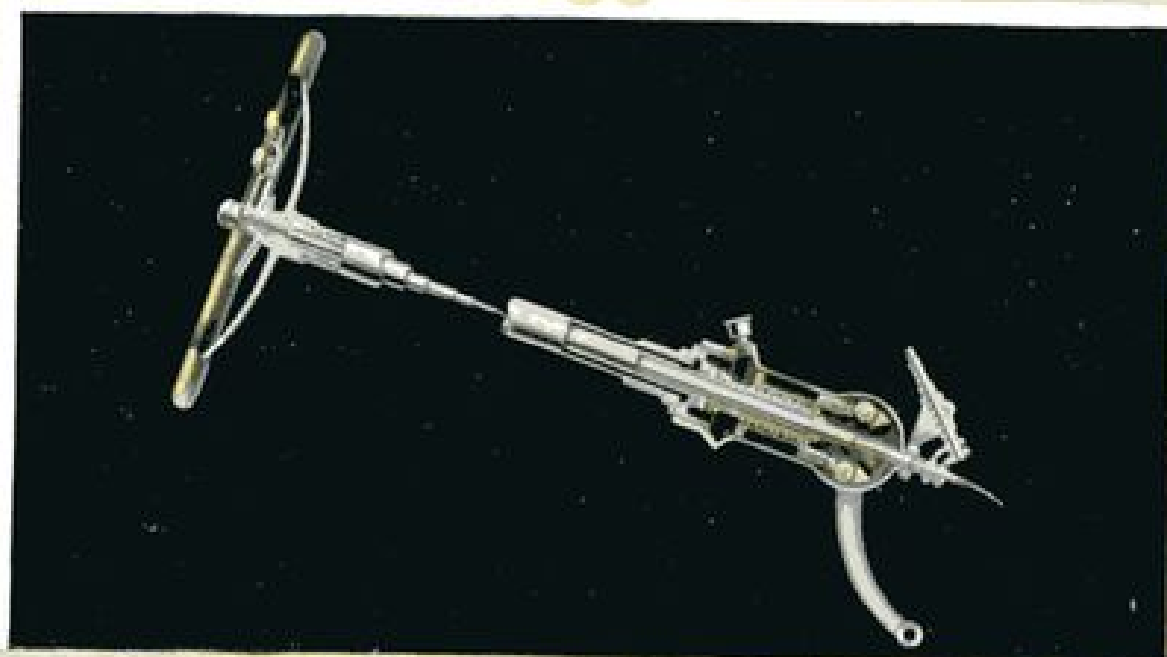
Another big feature of the full floating axle is its ready accessibility should repairs be necessary, as the entire rear driving apparatus can be removed in whole or in part in a few minutes and the work be done conveniently and with speed.

The differentials in Buick rear axles are of advanced design, made with particular reference to strength and quiet operation. The driving pinion and the large master gear are fitted with teeth of the spiral bevel type, and the whole differential is mounted on a strong carrier firmly secured to the housing. All the gears, in addition to being made to an accuracy of half a thousandth of an inch, are given a special heat treatment.

The drive shafts are of special alloy steel, heat treated, and the housing is made of pressed steel with detachable covers, and reinforced with a truss rod.

The bearings throughout are of the best anti-friction types, both ball and tapered roller bearings being used where experience has proved most desirable.

Powerful but extremely easy acting brakes of both internal expanding and external contracting type operate on large steel brake drums very securely bolted on both rear wheels.



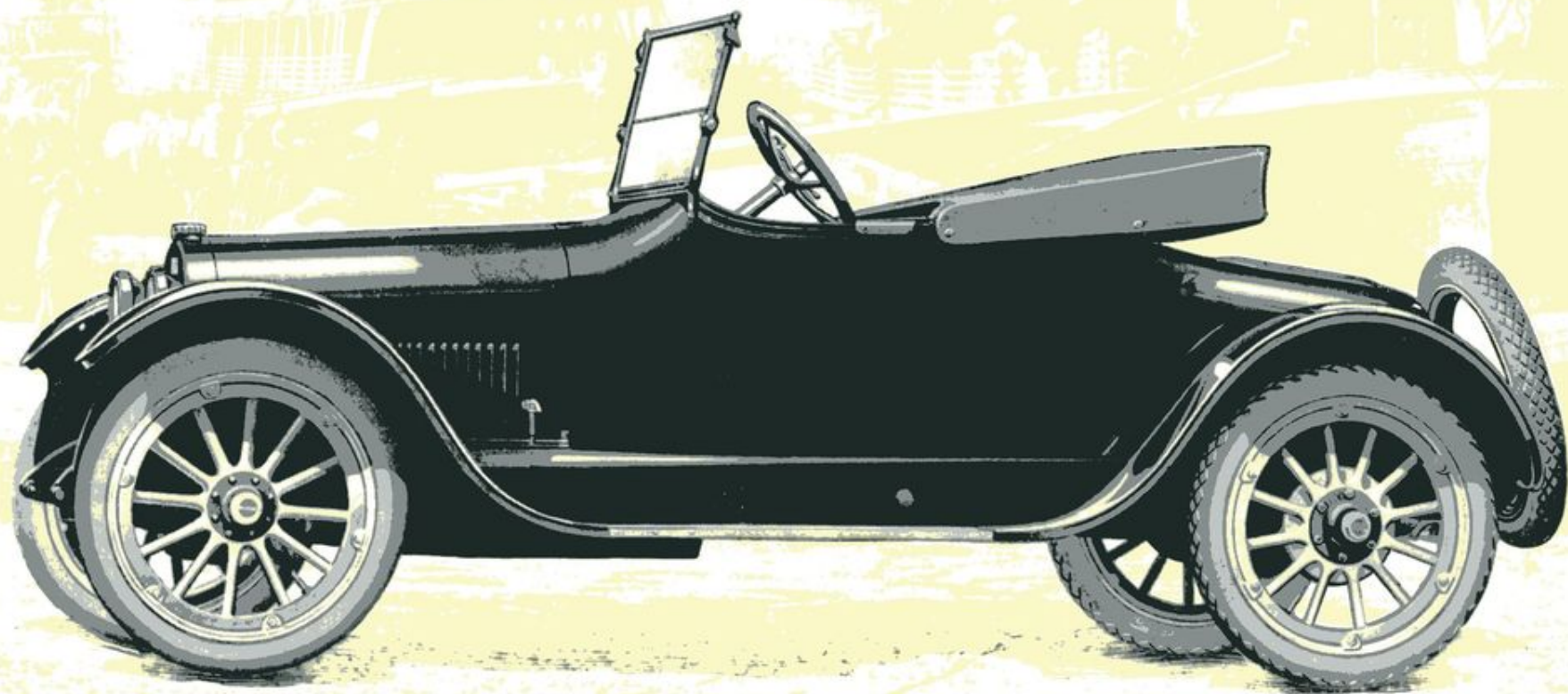
Buick Semi-Irreversible Steering Gear

Buick Steering Gear

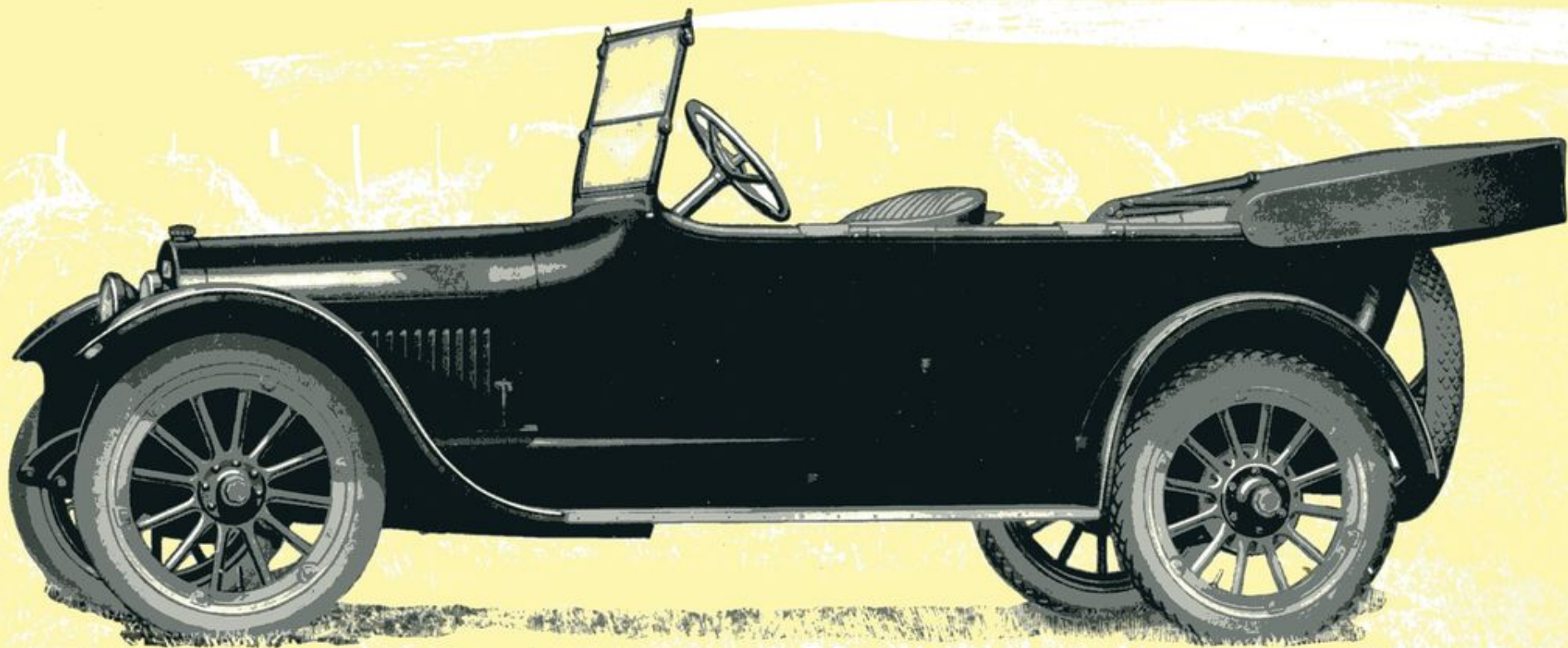
THE BUICK steering gear has been designed to combine the attributes of safety and ease of operation. It is of the semi-irreversible type, the principal advantages of which are entire relief from road shocks being transmitted through the steering mechanism, and ability to follow the tracks in mud or sand without wearisome maneuvering and without the danger of jumping the ruts. So, while the easy handling of the Buick steering mechanism will be appreciated by city users, it will be most enthusiastically endorsed by those who travel country roads to any extent.

The big, strong steering gear housing is bolted to the left side of the car frame, and contains the principal part of the mechanism. The steering wheel is of large diameter, the motion of the wheel being transmitted by means of a steel tube carrying a double threaded worm, or screw, engaging with two half nuts which slide up and down in guides in the housing, operating a steering yoke connected with an arm. The arm, in turn, operates a fore and aft rod connecting with the steering cross rod, directly behind the drop forged front axle. This connects the steering gear with both front wheels, through the medium of a series of carefully manufactured, drop forged steering connections.

As a result of this design, the factor of safety in Buick steering gears is very high. And because of the leverage provided by the large steering wheel, anti-friction bearings and the positive lubrication of every part, the car may be operated for many hours at a time without fatigue to the driver.



The Buick Model K-Six-44 Three-Passenger Roadster



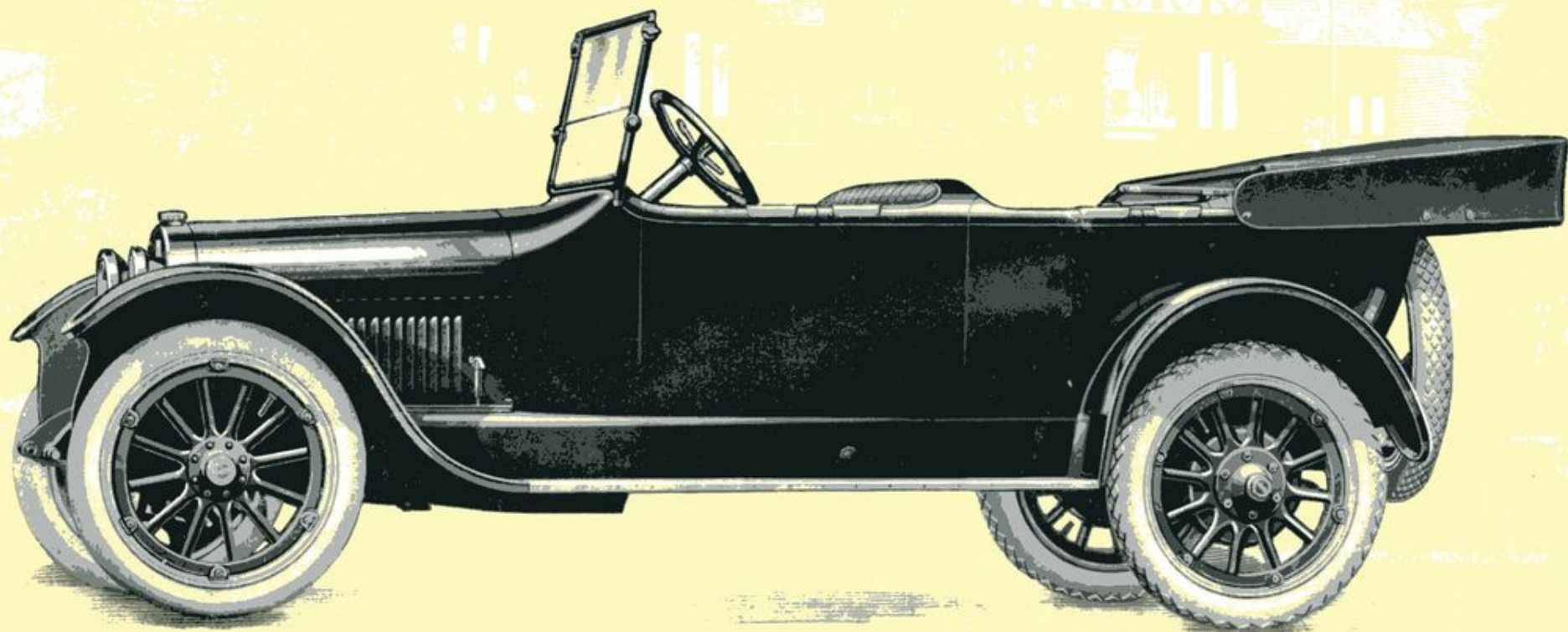
The Buick Model K-Six-45 Five-Passenger Touring Car



The Buick Model K-Six-46 Touring Coupe



The Buick Model K-Six-47 Five-Passenger Touring Sedan



The Buick Model K-Six-49 Seven-Passenger Touring Car



The Buick Model K-Six-50 Seven-Passenger Sedan